

Lundy (C. J.)

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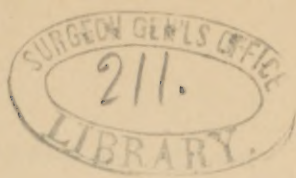
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MURIATE OF COCAINE IN OPHTHALMIC SURGERY.

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Muriate of cocaine, the new local anæsthetic, is attracting much attention from medical men all over the country, although it was first heard of in this country much less than two months ago. Probably the introduction of no other agent into medical and surgical practice has excited so much interest as has muriate of cocaine. It is to be hoped that this agent will not prove to be one of the ephemera which have so frequently made their appearance in the medical horizon of late. From present indications this will prove to be a valuable agent for producing local anæsthesia previous to performing certain surgical operations. So far as I am aware it has been used much more extensively in ophthalmic surgery than elsewhere. Already, scores of operations have been performed while the parts were under its influence, and the results have, in the main, been satisfactory. Its use in many instances renders unnecessary the use of a general anæsthetic, such as chloroform or ether, but it cannot always be employed to the exclusion of these latter. It has been successfully employed in operations on the eye, the nose, the uterus, etc. I have made many experiments with it, and have used it in a number of cases previous to operating, and the results obtained have been generally uniform. I employ a four per cent. solution, and one weaker than this is not likely to give satisfaction. After two drops of this solution were dropped into the eye, and repeated every three minutes till eight drops were used, it was observed that tolerably complete anæsthesia of the parts soon followed. Applied to the mucous membrane of the mouth or nose the results were similar. It seems to paralyze sensation in all parts of the trifacial nerve with which it comes in contact. As it has been used in uterine operations, and has there produced anæsthesia, it is quite probable that all parts of the human economy are susceptible to its influence. Although it produces anæsthesia of the conjunctiva and cornea, it is thought by some that it will not anæsthetize the iris. No doubt it will be difficult to affect this tissue by muriate of cocaine, owing to the fact that it is bathed with the aqueous humor of the anterior chamber. This humor will dilute the cocaine to such an extent that it will not be likely to produce complete anæsthesia of that tissue. But that it does exert a paralyzing influence upon the iris there can be no doubt, for its effects can be observed both in operations and otherwise. As we shall see, it partially paralyzes the

sphincter of the pupil, and dilates it widely. This it would not be likely to do, without also affecting its sensibility; especially so, when it paralyzes other branches of the same nerves which supply the iris.

After the use of the cocaine solution, the cornea begins to lose its sensibility within three or four minutes, and in many cases the corneal anæsthesia is complete in five minutes. However, in some cases the anæsthesia is not complete until the expiration of eight or ten minutes. The following case will illustrate its anæsthetic effect on the cornea:

A gentleman who was under treatment for an irritable and painful ulcer of the eye, and who had been treated with atropine, etc., in the morning, came several miles from an adjacent village in the afternoon, seeking relief from intense pain. Two drops of the muriate of cocaine were instilled into the eye, and this was repeated in four minutes. In less than eight minutes he was not only relieved of the pain, but the corneal ulcer could be touched with the point of a sharp instrument, without producing the slightest sensation.

The conjunctiva loses its sensibility after the use of cocaine in six to ten minutes, and can be firmly grasped with a fixation forceps without producing pain or discomfort. When the eye is turned from side to side by the forceps the patient experiences simply a sense of motion.

The anæsthesia of the cornea and conjunctiva lasts from twenty to thirty minutes after which time sensation gradually returns. In the case of painful ulcer already referred to, the relief from pain was complete for several hours.

Its action on the pupil and on the muscle of accommodation (ciliary muscle) were observed as follows: In five or six minutes the pupil began to dilate. The dilatation increased slowly for fifteen or twenty minutes, at which time the pupil was twice the normal size. In no case did I observe that the pupil was dilated *ad maximum*. The dilatation of the pupil lasts from twelve to twenty hours according to the quantity and strength of the solution employed. At no time was the pupil wholly irresponsive to light. In twelve to fifteen minutes I observed the first signs of failure in the power of accommodation. In twenty minutes the effect on the ciliary muscle was tolerably well marked, and print which before the use of the medicine could be seen at five or six inches, could not now be seen nearer than twelve to fourteen inches. Repeated attempts to fully dilate the pupil and render it wholly irresponsive to light were not successful in my hands. Neither did I succeed in producing anything like complete paralysis of accommodation.

It will be seen that muriate of cocaine not only produces tolerably complete paralysis of sensation, but that it also impairs the motility of parts to which it is applied. Although its influence in producing motor paralysis is slight, yet it does not

appear to be of such short duration as is the paralysis of sensation. While sensation is completely restored within thirty to sixty minutes in the normal eye, the power of accommodation does not return for several hours, and the pupillary sphincter does not regain its power for twenty hours.

It was observed that the parts became slightly hyperæmic soon after the use of the cocaine solution, and that they bled more freely when incised, than is usual in similar operations. From this I was led to infer that the cocaine exerted some influence over the vaso-motor nerves. This of course did not amount to anything like complete vaso-motor paralysis. It was also observed that the hyperæmia produced was of short duration—probably not lasting more than twenty to thirty minutes, after which time the parts presented a somewhat paler appearance than normal. For example, a medical student presented himself for experiment before the Wayne county medical society. The conjunctiva, both ocular and palpebral, was somewhat injected before the drug was used. For a short time (about half an hour) after its use the congestion was well marked, but later the conjunctiva was much paler than in the other eye.

I have employed cocaine muriate in a considerable number of operations upon the eye, such as extraction of cataract, enucleation, strabotomy, the removal of tarsal tumors, operations on lachrymal apparatus, etc. In most instances the patient experienced little or no pain, and where patients had any self-control the results were highly gratifying.

The use of this local anæsthetic will not prove entirely satisfactory in operating on children and persons who are extremely nervous and timid. Such persons think an operation must of necessity be attended with pain, and imagine the operation is painful whether it is or not. In one case, that of an extremely nervous boy, whose timidity was so great that the drops could be put in his eye with great difficulty, it was necessary to administer a little chloroform while operating for convergent strabismus. The right eye was bandaged while the left was being operated upon, but the bandage came off, and as soon as he could see distinctly what was being done he became uncontrollable, and it was necessary to give a little chloroform.

In one case of enucleation, I was able to do the greater part of the operation before the patient felt any pain. Had the patient not been a nervous, timid person, I think the operation could have been completed without difficulty. As it was a little chloroform was given previous to section of the optic and ciliary nerves. This patient was a bad subject for general anæsthesia, and by the use of the local anæsthetic, the necessity for, and the risk of, complete general anæsthesia were avoided. In cases of this character, muriate of cocaine will probably prove itself of great value, for while it produces a sufficient degree of anæsthesia of the part operated upon, the danger of chloroform

is avoided. Even if chloroform is administered at the same time, it need not be carried to the point of complete narcosis.

In an operation for cataract the patient stated that he felt no pain whatever. The only thing of which he was cognizant was a pressure; but whether this was from the speculum between the lids, or from the pressure of the shell scoop upon the cornea in delivering the lens, I do not know.

Bowman's operation upon the lachrymal apparatus was done several times with scarcely a particle of pain. In one case the division of stricture in the nasal duct produced as much pain as that operation usually does. When I succeeded in getting any of the solution through the duct into the nose, the passage of the knife produced but little suffering. In one very nervous subject, who fainted during an operation done previously for removal of a tarsal tumor, no pain was felt when a similar operation was done after the use of the cocaine. In this case the incision was made upon the conjunctival surface of the lid. Patients who have been operated upon for strabismus say that while they feel no pain they experience a "sensation of motion," or a drawing or pulling of the eye when the strabismus hook raises the tendon previous to the tenotomy.

In a canthoplastic operation, the pain was less severe than usual, but the operation was by no means painless. Had the skin at the outer angles of the eye been well bathed with the cocaine I doubt if the operation would have produced any considerable pain. While cocaine lessens the sensibility of the skin, it does not destroy it; therefore, for operations involving the integument it will not be valuable, unless the hypodermic injection of the drug can be done with safety. Under such circumstances it would seem that some of the minor operations might be done without producing pain.

In regard to enucleation of the eye, which is regarded as a painful operation, and one which is seldom or never done without an anæsthetic, I would suggest that a subconjunctival injection of the cocaine solution be made previous to beginning the operation. If the medicine have been previously dropped upon the conjunctiva, the passage of the hypodermic needle would scarcely be felt and sensation could thus be destroyed in all nerves likely to be severed in the operation.

How wide will be the range of usefulness of this new drug, time alone can determine. It may have objectionable features which we have not yet discovered, and like other lights it may prove to have a shadow. It will be sometime before we can estimate its real value and give it its proper place in our list of useful agents. If, however, it proves to be in reality all that it seems to be, it will be an invaluable addition to the armamentarium of the ophthalmic surgeon. And its usefulness will not be confined to ophthalmic practice, for its anæsthetic power will prove advantageous in a thousand ways.



